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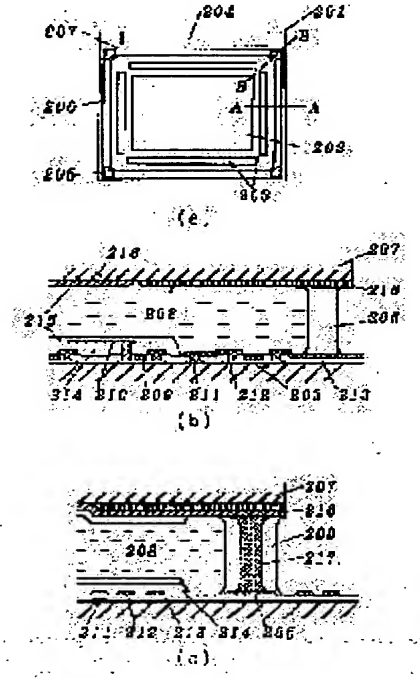
(54) LIQUID CRYSTAL DISPLAY DEVICE

(57)Abstract:
PURPOSE: To provide the liquid crystal display device which is small in size, is large in opening rate, is decreased in the moisture infiltrating from a sealing boundary and has improved reliability by insulating signal lines and pixel electrodes with polyimide and arranging driver circuits on a substrate on the side inner than seals.
CONSTITUTION: Display regions 202, driver circuits 203, etc., are formed on a transparent element substrate 201. The driver circuits 203 are formed between the seals 206 and the display regions 202. Pixel driving transistors 209, the pixel electrodes 210, scanning lines included in wiring layers 211 and the signal lines included in the wiring layers 212 are formed in the display regions 202. The wiring layers 211, 212 are insulated by interlayer insulating films 213. The wiring layers 212 and the pixel electrodes 210 are insulated by interlayer insulating films 214 consisting of polyimide. Further, the parts on the driver circuits 203 and under the seals 206 are removed from the interlayer insulating films 214. The parts overlapping on the seals 206 and the parts facing the driver circuits 203 are removed from the common electrode 21 on a counter substrate 207.



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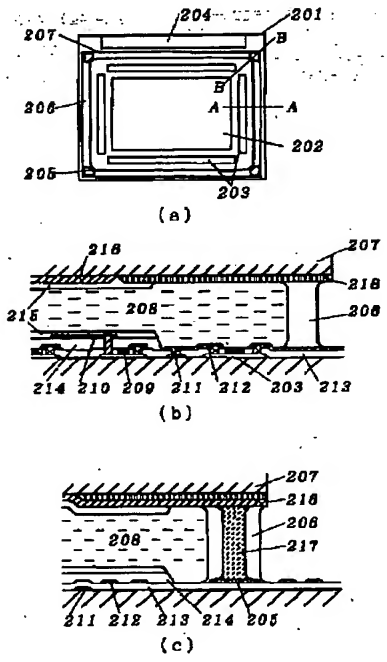
(54)【発明の名称】　液晶表示装置

(57)【要約】

【目的】小型で開口率が大きく信頼性の高いドライバー回路一体型の液晶表示装置を実現する。

【構成】ポリイミドで信号線と画素電極を絶縁して間隔を小さくする。ドライバー回路はシールより内部に配置してシールを横切る配線数を減らす。ドライバー回路上とシールの下になるポリイミドは取り除く。



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【特許請求の範囲】

【請求項1】少なくともマトリクス状に配置された画素電極、前記画素電極のそれぞれに接続された画素駆動薄膜トランジスタ、前記画素駆動薄膜トランジスタに接続された一組の信号配線と一組の走査配線、さらに前記信号配線及び走査配線をそれぞれ駆動するドライバー回路を有する素子基板と、共通電極を有し前記素子基板に対向する対向基板と、前記素子基板と前記対向基板の間に封止した液晶からなるアクティブマトリクス型液晶表示装置において、前記素子基板上の画素駆動用薄膜トランジスタ上、前記信号配線上及び前記走査配線上に有機膜があり、前記有機膜上に前記画素電極があり、前記ドライバー回路が前記素子基板と前記対向電極とを接合すると同時に液晶を封止するシール部より画素電極側にあり、前記ドライバー回路上及び前記シール部には前記有機膜が無く、前記ドライバー回路に対向する部分には前記対向基板上の前記共通電極が無いことを特徴とする液晶表示装置。

【請求項2】前記有機膜がポリイミド膜である事を特徴とする請求項1の液晶表示装置。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は2枚の基板間に封入された液晶を用いて表示を行う、ドライバー回路一体形成のアクティブマトリクス型液晶表示装置の構造に関する。

【0002】

【従来の技術】従来のドライバー回路内蔵アクティブマトリクス型液晶表示装置（以下、単に液晶表示装置とする）の一例を図1を用いて説明する。図1（a）は従来の液晶表示装置の概略の外観図であり、図1（b）は図1（a）のA－Aにおける縦断面図、図1（c）は図1（a）のB－B縦断面図である。素子基板101上には表示領域102、走査線及び信号線のドライバー回路103及び104、外部接続端子105が形成され、対向基板106がシール107で素子基板101に接合され、素子基板101と対向基板106の間に液晶108が封入されている。対向基板106上には共通電極109が設けられ、この共通電極109は素子基板101上のコモン端子110に導通剤111で接続されている。また、対向基板106上には遮光層112が設けられている。素子基板101の表示領域102には、画素駆動トランジスタ113が設けられ、画素電極114が画素駆動トランジスタ113に接続されている。画素駆動トランジスタ113及びドライバー回路103（104）のゲート電極と走査線を含む第1の配線層115は層間絶縁膜116で第2の配線層117と隔てられ、必要な箇所で第2の配線層117と接続されている。第2の配線層117は表示領域の信号線を含み、画素電極114と同層に設けられている。第2の配線層117の上層は液晶保護絶縁膜118で第2の配線層117の信号が液

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晶に直接漏れるのを防ぐために設けられる。液晶保護絶縁膜118は画素電極114上は通常取り除いておく。素子基板101上と対向基板106上には更に配向膜119がある。

【0003】図1の液晶表示装置では画素電極114と信号線（第2の配線層117）が同層にあり、短絡を避けるため有る程度の間隔を確保する必要があり、その間隔の部分は表示に寄与しない。これは液晶表示装置の高開口率化や高精細化の妨げとなる。この問題を解決するため、信号線上に更に層間絶縁膜を設け、この上層に画素電極を設ける事で画素電極と信号線を絶縁し、画素電極と信号線の距離を小さくする、あるいは信号線と画素電極を重ねるといった方法がとられる場合がある。上記の信号線上の層間絶縁膜はSiO2あるいはポリイミド等の有機薄膜が用いられる。信号線上の層間絶縁膜は、その形成方法の簡便さ、誘電率の小ささ（信号線と画素電極の結合容量を小さくするため）、ストレスが小さい事による厚膜化の容易さ（誘電率と同じ理由による）、さらには膜表面の平坦性をSiO2よりも良くしやすいので表示品質が良い等の観点からポリイミドを用いるのが有利である。

【0004】

【発明が解決しようとする課題】図1のような従来の液晶表示装置では、ドライバー回路がシールよりも外側にあるため装置自体が大きくなってしまい、また、素子基板と対向基板の接合後の製造途上における取扱い中にドライバー回路を傷つけ易く故障を招き易いという問題があった。また、ドライバー回路がシールよりも外側にあるため、シールを横切る配線（信号線と走査線）が多く、ドライバー回路から表示領域につながる配線とシールの界面を通じて水分が液晶中に浸入し、液晶を劣化させるという問題があった。

【0005】

【課題を解決するための手段】本発明の液晶表示装置は、素子基板上に形成された素子駆動薄膜トランジスタ、信号線及び走査線を有機膜で覆い、前記有機膜上に画素電極を設ける事で信号線と画素電極を絶縁し、ドライバー回路を素子基板と対向基板を接合するシールより画素電極側に形成し、ドライバー回路上には有機膜を設けず、かつドライバー回路に対向する部分の対向基板上の共通電極が無いことを特徴とする。

【0006】

【実施例】以下に、本発明のドライバー回路内蔵アクティブマトリクス型液晶表示装置とその製造工程について実施例に基づき詳しく説明する。

【0007】図2に本実施例の液晶表示装置の構造を示す。図2（a）は本実施例の液晶表示装置の平面図であり、図2（b）、図2（c）はそれぞれ図2（a）のA－A、B－Bにおける縦断面図である。透明な素子基板201上には表示領域202、ドライバー回路203、

外部接続端子２０４、コモン端子２０５およびこれらを接続する配線等が形成されており、シール２０６によって素子基板２０１と対向基板２０７が接合され、両基板間に液晶２０８が封入されている。ドライバー回路２０３はシール２０６と表示領域２０２の間に設けてある。こうすることでドライバー回路２０３が表示領域２０２より外側にある場合に比べ液晶表示装置を小型にできる。表示領域２０２には画素駆動トランジスタ２０９、画素電極２１０、画素駆動トランジスタ２０９及びドライバー回路２０３のゲート電極と共に第１の配線層２１１に含まれる走査線、第２の配線層２１２に含まれる信号線が形成され、第１の配線層２１１と第２の配線層２１２は第１の層間絶縁膜２１３で、また、第２の配線層２１２と画素電極２１０は第２の層間絶縁膜２１４で絶縁されている。第２の層間絶縁膜２１４は、ドライバー回路２０３上とシール２０６の下の部分を取り除いておく。これは、主にポリイミドが用いられる第２の層間絶縁膜２１４がドライバー回路２０３の配線の電界によって恒常的な分極を起こし、長期的には大きな面積に及んで液晶の配向を乱すことによる表示品質の劣化を防ぐことが目的であると共に、ポリイミドを通じて水分や不純物が液晶中に浸入するのをふせぐ。素子基板２０１上には、さらに液晶を配向するための配向膜２１５が形成されている。コモン端子２０５と対向基板２０７上の共通電極２１６は導通剤２１７で電気的に接続され共通電極２１６の電位が制御される。対向基板２０７上には共通電極２１６の他に配向膜２１５と必要に応じて遮光膜２１８及びカラーフィルターが予め形成されている。（本実施例ではカラーフィルターは省略してある。）対向基板２０７上の共通電極２１６は、シール２０６と重なる部分とドライバー回路２０３に対向する部分を取り除いておく。こうすることで素子基板２０１上のコモン端子２０５以外の配線と共通電極２１６が、シール２０６中やドライバー回路２０３上のごみ等により短絡することを防ぐ。

【０００８】次に、本実施例の液晶表示装置の製造工程を図３を用いて説明する。図３は本実施例の液晶表示装置の構造を説明した図２（ｂ）に相当する部分の縦断面で製造工程を説明する図である。

【０００９】まず、素子基板３０１上に画素駆動トランジスタ３０２、ドライバー回路３０３を形成する。走査線及び画素駆動トランジスタ３０２とドライバー回路３０３のゲート電極を含む第１の配線層３０４、第１の層間絶縁膜３０５、信号線を含む第２の配線層３０６をこの時形成する（図３（ａ））。本実施例では画素トランジスタ３０２とドライバー回路３０３は多結晶シリコン薄膜トランジスタで構成される。第１の配線層３０４には多結晶シリコンを用いるが、金属シリサイドあるいは金属を用いても良く、第１の層間絶縁膜３０５はシリコン酸化膜（SiO_2）かシリコン窒化膜（Si_3N_4）、

あるいはそれらの多層膜である。第２の配線層３０６には通常アルミニウム（Ａ１）合金（銅とシリコンを含む）を用いる。

【００１０】次に、素子基板３０１上に第２の層間絶縁膜３０７を形成し、その上に画素電極３０８を形成し、画素駆動トランジスタ３０２に第２の層間絶縁膜３０７に開けたコンタクト孔を通じて接続する。さらに配向膜３０９を形成する（図３（ｂ））。図３（ｂ）の工程をより詳しく説明すると、本実施例では第２の層間絶縁膜３０７（ここではポリイミドである）をスピンコートで塗布成膜した後、画素電極３０８と画素トランジスタ３０２とを接続するコンタクト孔をフォトリソグラフ法で形成するが、この時第２の配線層３０６が露出しない様にする。即ちドライバー回路３０３の上やシールの下になる部分にはこの時点ではまだ第２の層間絶縁膜３０７が残っている。次に画素電極３０８を形成し、その後ドライバー回路３０３の上とシールの下になる部分の第２の層間絶縁膜３０７を取り除く。これは画素電極３０８に酸化インジウムスズ（ＩＴＯ）を用い、そのエッチング成形に王水系のエッチング剤（硝酸と塩酸を含む水溶液）を用いる場合、第２の配線層３０６即ちＡｌが露出しているとＩＴＯのエッチング剤にＡｌが侵されるためである。ＩＴＯ（即ち画素電極３０８）を例えば水素やメタンを含むプラズマ中でエッチング成形する場合には第２の配線層３０６は露出していてもかまわないので、第２の層間絶縁膜３０７成形工程を１回にすることもできる。第２の層間絶縁膜３０７はここではポリイミド薄膜であるが、他の樹脂薄膜でも比較的耐熱性が高く、透明であれば用いる事が出来る。また、第２の層間絶縁膜３０７はポリイミドとSiO_2あるいはSi_3N_4との多層膜でも良い。この場合にはドライバー回路３０３上及びシール下となる第２の層間絶縁膜３０７のうち必ず取り除く必要のあるのはポリイミドで他は残しても取り去っても良い。また配向膜３０９もポリイミド薄膜であり、形成は印刷技術（フレキソ印刷等）を用いて行い、液晶を配向するために必要な部分にのみ形成する。配向膜３０９の形成はスピンコート法で行うこともある。

【００１１】配向膜３０９を形成した素子基板３０１はシール３１０で対向基板３１１と接合し、液晶３１２を封入する（図３（ｃ））。さらに外部回路を外部接続端子に接続して液晶表示装置を完成する。

【００１２】

【発明の効果】本発明の液晶表示装置では、信号線と画素電極がポリイミドを層間絶縁膜として別層に形成されることで開口率を大きくすることが可能な上に、ポリイミドはスピンコート法で形成されるので、素子基板表面が平坦なため液晶の配向の乱れが無く高品質な表示が得られる。さらに素子基板上のドライバー回路がシールより表示領域側にあるためドライバー回路から画素領域に延びる延べ数百本に及ぶ信号線や走査線がシールを横切

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ることがなく、シールを横切る配線を外部接続端子からドライバー回路につながる電源線、クロック線、ビデオ信号線など高々数十本と従来比べ格段に少なくできるので、シールを横切る配線とシール界面から浸入する水分を格段に少なくでき、信頼性が高い。また、ドライバー回路がシールの内側にあるのでドライバー回路がシールの外にある場合に比べて装置を小型にできる効果があり、また素子基板と対向基板を接合した後の取扱い（例えばダイシング工程）でドライバー回路を傷つけるようなこともない。

【図面の簡単な説明】

【図１】従来のドライバー回路内蔵のアクティブマトリクス型液晶表示装置の構造図。

【図２】本発明のドライバー回路内蔵のアクティブマトリクス型液晶表示装置の構造図。

【図３】本発明のドライバー回路内蔵のアクティブマトリクス型液晶表示装置の製造方法を説明する工程図。

【符号の説明】

１０１、２０１、３０１　…素子基板
１０２、２０２　…表示領域

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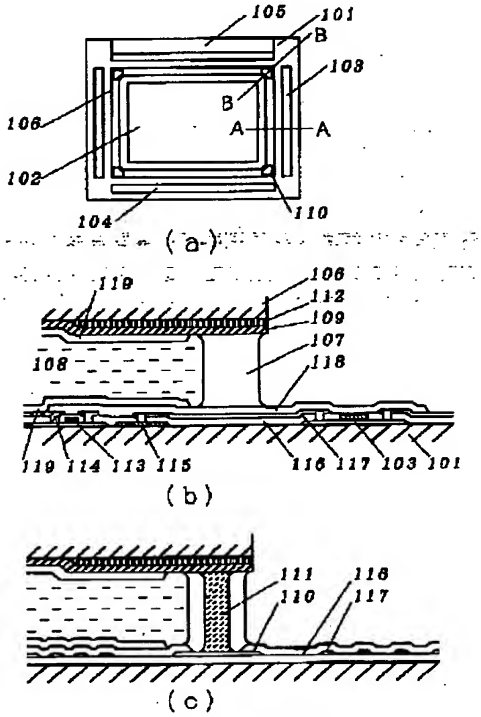
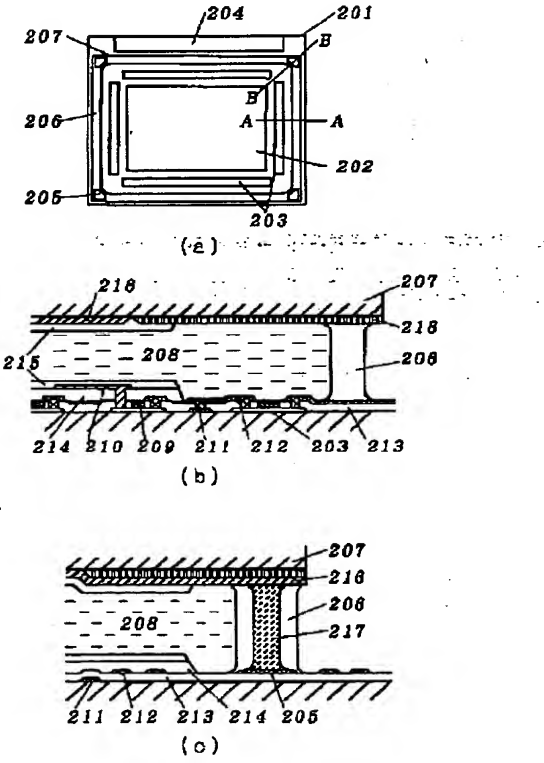
１０３、１０４、２０３、３０３…ドライバー回路
１０５、２０４　…外部接続端子
１０６、２０７、３１１　…対向基板
１０７、２０６、３１０　…シール
１０８、２０８、３１２　…液晶
１０９、２１６　…共通電極
１１０、２０５　…コモン端子
１１１、２１７　…導通剤
１１２、２１８　…遮光層
１１３、２０９、３０２　…画素駆動トランジスタ
１１４、２１０、３０８　…画素電極
１１５、２１１、３０４　…第１の配線層
１１６　…層間絶縁膜
１１７、２１２、３０６　…第２の配線層
１１８　…液晶保護絶縁膜
１１９、２１５、３０９　…配向膜
２１３、３０５　…第１の層間絶縁膜
２１４、３０７　…第２の層間絶縁膜

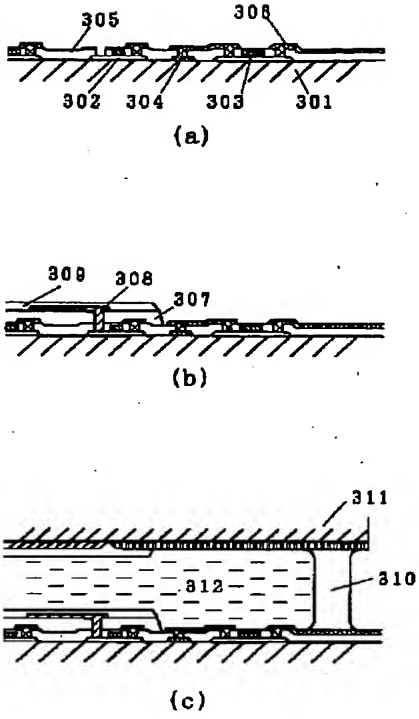
【図１】



【図２】



【図3】



[Claim(s)]
[Claim 1] The pixel drive thin film transistor connected to each of the pixel electrode arranged in the shape of a matrix at least, and said pixel electrode, The signal wiring of a lot and scan wiring of a lot which were connected to said pixel drive thin film transistor, and the component substrate which has the driver line which drives said signal wiring and scan wiring further, respectively, In the active matrix liquid crystal display which consists of liquid crystal closed between the opposite substrate which has a common electrode and counters said component substrate, and said component substrate and said opposite substrate The organic film is on the thin film transistor for a pixel drive on said component substrate, said signal wiring, and said scan wiring. It is in a pixel electrode side from the seal section which closes liquid crystal at the same time said pixel electrode is on said organic film and said driver line joins said component substrate and said counterelectrode. The liquid crystal display characterized by not finding said organic film in said driver line top and said seal section, and not finding said common electrode on said opposite substrate in the part which counters said driver line.
[Claim 2] The liquid crystal display of claim 1 characterized by said organic film being polyimide film.

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention really [driver line] which displays using the liquid crystal enclosed between two substrates relates to the structure of the active matrix liquid crystal display of formation.
[0002]
[Description of the Prior Art] An example of the conventional active matrix liquid crystal display (it only considers as a liquid crystal display hereafter) with a built-in driver line is explained using drawing 1 . Drawing 1 (a) is the external view of the outline of the conventional liquid crystal display, and drawing of longitudinal section [in / in drawing 1 (b) / A-A of drawing 1 R> 1 (a)] and drawing 1 (c) are B-B drawings of longitudinal section of drawing 1 (a). On the component substrate 101, the driver lines 103 and 104 of a viewing area 102, the scanning line, and a signal line and the external connection terminal 105 are formed, the opposite substrate 106 is joined to the component substrate 101 with a seal 107, and liquid crystal 108 is enclosed between the component substrate 101 and the opposite substrate 106. The common electrode 109 is formed on the opposite substrate 106, and this common electrode 109 is connected to the common terminal 110 on the component substrate 101 by the flow agent 111. Moreover, the protection-from-light layer 112 is formed on the opposite substrate 106: The pixel drive transistor 113 is formed in the viewing area 102 of the component substrate 101, and the pixel electrode 114 is connected to the pixel drive transistor 113. The 1st wiring layer 115 containing the pixel drive transistor 113, and the gate electrode and the scanning line of a driver line 103 (104) is separated from the 2nd wiring layer 117 with an interlayer insulation film 116, and is connected with the 2nd wiring layer 117 in the required part. The 2nd wiring layer 117 is formed in the pixel electrode 114 and this layer including the signal line of a viewing area. The upper layer of the 2nd wiring layer 117 is prepared in order to prevent the signal of the 2nd wiring layer 117 leaking to liquid crystal directly by the liquid crystal protection insulator layer 118. The liquid crystal protection insulator layer 118 usually removes the pixel electrode 114 top. There is the orientation film 119 on the component substrate 101 and the opposite substrate 106 further.
[0003] The pixel electrode 114 and a signal line (the 2nd wiring layer 117) are in this layer, it is necessary to secure spacing of extent which exists in order to avoid a short circuit, and the part of the spacing does not contribute to a display in the liquid crystal display of drawing 1 . This serves as hindrance of a raise in the numerical aperture of a liquid crystal display, or highly-minute-izing. Since this problem is solved, the method of insulating a signal line with a pixel electrode by preparing an interlayer insulation film further on a signal line, and preparing a pixel electrode in this upper layer, and making distance of a pixel electrode and a signal line small, or piling up a signal line and a pixel electrode may be taken. As for the interlayer insulation film on the above-mentioned signal line, organic thin films, such as SiO2 or polyimide, are used. Since it is further easy to improve surface smoothness on the front face of the film rather than SiO2, as for the interlayer insulation film on a signal line, it is advantageous the simplicity of the formation approach, the smallness of a dielectric constant,

the ease (based on the same reason as a dielectric constant) of thick-film-izing by stress being small (in order making small joint capacity of a signal line and a pixel electrode), and to use polyimide from viewpoints, like display quality is good.

[0004]

[Problem(s) to be Solved by the Invention] In a conventional liquid crystal display like drawing 1, since a driver line was outside a seal, equipment itself became large, and the problem of being easy to cause failure it being easy to damage a driver line was during the handling in the manufacture way after junction of a component substrate and an opposite substrate. Moreover, since a driver line was outside a seal, there was much wiring (a signal line and scanning line) which crosses a seal, moisture permeated into liquid crystal through the interface of the wiring and the seal which are connected with a viewing area from a driver line, and there was a problem of degrading liquid crystal.

[0005]

[Means for Solving the Problem] It is characterized by for the liquid crystal display of this invention not to have a common electrode on the opposite substrate of the part which covers the component drive thin film transistor, the signal line, and the scanning line formed on the component substrate by the organic film, insulates a pixel electrode with a signal line by preparing a pixel electrode on said organic film, forms a driver line in a pixel electrode side from the seal which joins a component substrate and an opposite substrate, and does not prepare the organic film on a driver line, and counters a driver line.

[0006]

[Example] Below, the active matrix liquid crystal display with a built-in driver line and production process of this invention are explained in detail based on an example.

[0007] The structure of the liquid crystal display of this example is shown in drawing 2. Drawing 2 (a) is the top view of the liquid crystal display of this example, and drawing 2 (b) and drawing 2 (c) are drawings of longitudinal section in A-A of drawing 2 (a), and B-B, respectively. On the transparent component substrate 201, wiring which connects a viewing area 202, a driver line 203, the external connection terminal 204, the common terminal 205, and these is formed, with the seal 206, the component substrate 201 and the opposite substrate 207 are joined, and liquid crystal 208 is enclosed among both substrates. The driver line 203 is formed between the seal 206 and the viewing area 202. Compared with the case where a driver line 203 is outside a viewing area 202, a liquid crystal display can be made small by carrying out like this. The scanning line contained in the 1st wiring layer 211 with the pixel drive transistor 209, the pixel electrode 210, the pixel drive transistor 209, and the gate electrode of a driver line 203 and the signal line contained in the 2nd wiring layer 212 are formed in a viewing area 202, the 1st wiring layer 211 and 2nd wiring layer 212 are the 1st interlayer insulation film 213, and the 2nd wiring layer 212 and pixel electrode 210 are insulated with the 2nd interlayer insulation film 214. The 2nd interlayer insulation film 214 removes the part under a seal 206 the driver line 203 top. This prevents moisture and an impurity permeating into liquid crystal through polyimide while it is the purpose to prevent degradation of the display quality by the 2nd interlayer insulation film 214 with which polyimide is mainly used attaining to a lifting and a big area in the long run in constant polarization, and disturbing the orientation of liquid crystal by the electric field of wiring of a driver line 203. On the component substrate 201, the orientation film 215 for carrying out orientation of the liquid crystal further is formed. The common electrode 216 on the common terminal 205 and the opposite substrate 207 is electrically connected by the flow agent 217, and the potential of the common electrode 216 is controlled. On the opposite substrate 207, the light-shielding film 218 and color filter other than the common electrode 216 are formed beforehand the orientation film 215 and if needed. (The color filter is omitted in this example.) The common electrode 216 on the opposite substrate 207 removes the part which laps with a seal 206, and the part which counters a driver line 203. Wiring of those other than common terminal 205 on the component substrate 201 and the common electrode 216 prevent connecting too hastily with the inside of a seal 206, the contaminant on a driver line 203, etc. by carrying out like this.

[0008] Next, the production process of the liquid crystal display of this example is explained using drawing 3. Drawing 3 is drawing which explains a production process in the longitudinal section of the part equivalent to drawing 2 (b) explaining the structure of the liquid crystal display of this example.

[0009] First, the pixel drive transistor 302 and a driver line 303 are formed on the component substrate 301. The 2nd wiring layer 306 containing the scanning line and the pixel drive transistor 302, the 1st wiring layer 304 containing the gate electrode of a driver line 303, the 1st interlayer insulation film 305, and a signal line is formed at this time (drawing 3 (a)). At this example, the pixel transistor 302 and a driver line 303 consist of polycrystalline silicon thin film transistors. Although polycrystalline silicon is

used for the 1st wiring layer 304, metal silicide or a metal may be used and the 1st interlayer insulation film 305 is silicon oxide (SiO2), silicon nitrides (Si3N4), or those multilayers. An aluminum (aluminum) alloy (copper and silicon are included) is usually used for the 2nd wiring layer 306.

[0010] Next, the 2nd interlayer insulation film 307 is formed on the component substrate 301, the pixel electrode 308 is formed on it, and it connects with the pixel drive transistor 302 through the contact hole opened in the 2nd interlayer insulation film 307. Furthermore, the orientation film 309 is formed (drawing 3 (b)). the contact hole which connects the pixel electrode 308 and the pixel transistor 302 after carrying out spreading membrane formation of the 2nd interlayer insulation film 307 (here, it is polyimide) on a spin coat in this example, if the process of drawing 3 (b) is explained in more detail -- photograph RISOGURAFU -- although formed by law, it is made not exposed [the 2nd wiring layer 306] at this time That is, at this time, the 2nd interlayer insulation film 307 still remains in the part which becomes a driver line 303 top and the bottom of a seal. Next, the 2nd interlayer insulation film 307 of the part which forms the pixel electrode 308 and becomes the bottom of a seal a driver line 303 top after that is removed. This is because aluminum is invaded by the etching agent of ITO, when exposed [using indium tin oxide (ITO) for the pixel electrode 308, using the etching agent (water solution containing a nitric acid and a hydrochloric acid) of an aqua-regia system for the etching shaping, and], the 2nd wiring layer 306, i.e., aluminum. Since the 2nd wiring layer 306 may be exposed when carrying out etching shaping of the ITO (namely, pixel electrode 308) in the plasma containing hydrogen or methane, the 2nd interlayer insulation film 307 forming cycle can also be carried out at once. Although it is a polyimide thin film here, the 2nd interlayer insulation film 307 can be used with other resin thin films, if thermal resistance is comparatively high and it is transparent. Moreover, multilayers with polyimide, SiO2, or Si3N4 are sufficient as the 2nd interlayer insulation film 307. In this case, with polyimide, it may leave others that there is the need of surely removing among the 2nd interlayer insulation film 307 which becomes a driver line 303 top and the bottom of a seal, or it may remove them. Moreover, it forms only in a part required in order that the orientation film 309 may also be a polyimide thin film, may perform formation using printing techniques (flexographic printing etc.) and may carry out orientation of the liquid crystal. Formation of the orientation film 309 may be performed with a spin coat method.

[0011] It joins to the opposite substrate 311 with a seal 310, and the component substrate 301 in which the orientation film 309 was formed encloses liquid crystal 312 (drawing 3 (c)). Furthermore an external circuit is connected to an external connection terminal, and a liquid crystal display is completed.

[0012]

[Effect of the Invention] In the liquid crystal display of this invention, since polyimide is formed in the top which can enlarge a numerical aperture by a signal line and a pixel electrode being formed in another layer by using polyimide as an interlayer insulation film with a spin coat method, and the component substrate front face is flat, there is no turbulence of the orientation of liquid crystal, and a quality display is obtained. the number of totals prolong from a driver line to a pixel field since the driver line on a component substrate be furthermore in a viewing area side from a seal -- since the power source line connect with a driver line , a clock line , a video signal line , etc. compare dozens of [at most] and conventionally , and boil markedly and wiring which as many as 100 signal lines or the scanning lines do not cross a seal and cross a seal can lessen from an external connection terminal , the moisture which permeate from a Shilu side look like [wiring which cross a seal] markedly , it can do few , and it be reliable It seems that moreover, a driver line is not damaged by the handling (for example, dicing process) after there being effectiveness which can make equipment small compared with the case where a driver line is out of a seal since a driver line is inside a seal, and joining a component substrate and an opposite substrate.

[Brief Description of the Drawings]

[Drawing 1] Structural drawing of an active matrix liquid crystal display with a driver line built-in [conventional].

[Drawing 2] Structural drawing of an active matrix liquid crystal display with a built-in driver line of this invention.

[Drawing 3] Process drawing explaining the manufacture approach of an active matrix liquid crystal display with a built-in driver line of this invention.

[Description of Notations]

101, 201, 301 -- component substrate
102 202 -- Viewing area
103, 104, 203, 303 -- Driver line
105 204 -- External connection terminal
106, 207, 311 -- opposite substrate
107, 206, 310 -- Seal
108, 208, 312 -- Liquid crystal

109 216 -- Common electrode
110 205 -- Common terminal
111 217 -- Flow agent
112 218 -- Protection-from-light layer
113, 209, 302 -- Pixel drive transistor
114, 210, 308 -- pixel electrode
115, 211, 304 -- The 1st wiring layer
116 [ ] -- Interlayer Insulation Film
117, 212, 306 -- The 2nd wiring layer
118 [ ] -- Liquid Crystal Protection Insulator Layer
119, 215, 309 -- orientation film
213 305 -- The 1st interlayer insulation film
214 307 -- The 2nd interlayer insulation film